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Grounds Maintenance Cost Report.

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A grounds maintenance study was accomplished over the period of March 1965 through February 1966 to--(1) determine current grounds maintenance cost distribution; (2) provide basis for future grounds maintenance budgeting, and (3) provide basic data by which future landscape project designs can be developed to project or reduce maintenance costs. The data is charted for maintenance cost recapitulation by campus zones. Separate cost categories shown are labor, supply and expense, equipment and facilities, total cost per zone per year, and total cost per acre per year. For each campus zone further breakdowns are made by type of ground cover (i.e. grass, shrubs, sealed surface, etc) and by functional use (parking and improved areas). Some significant conclusions regarding maintenance costs are listed. (HH)

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GROUNDS MAINTENANCE COST REPORT

By
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Introduction

Physical Plant Administrators in various institutions when budgeting for Physical Plant Maintenance, have one thing in common--never do they obtain adequate funds to do the job as they would like. Beyond this similarity, each institution will have major or minor differences in the methods by which it establishes or justifies its requests for operating and maintenance funds.

For Grounds Maintenance budgeting there are probably more dissimilarities than for the different components of Building Maintenance. In Building Maintenance the building area measured in square feet has been heavily used as the unit for budgeting and recording maintenance cost experience. In Grounds Maintenance such a simple unit was not available. Inasmuch as the institution, in its annual reporting, recorded its cost experience in terms of cost per square feet for such items as Janitorial Service, Repairs, Heating, and Refuse Disposal, it was logical in the tabulation to include also the Grounds Maintenance cost at so much a building area square foot. What is not logical, however, is that Grounds Maintenance costs should be budgeted on the basis of square feet of building space.

Until quite recently the University of California was following this practice on its different campuses and the coordinating budget officers by empirical, vague, and unwritten reasoning somehow made adjustments in these budgets which were to properly compensate for changes resulting from the unprecedently rapid growth on all fronts. In 1963 when the writer assumed the responsibilities of Physical Plant Administrator for the University of California, Santa Barbara, the campus covered approximately 400 acres of beachfront land and accommodated a student enrollment of 6,000. After the first discouraging experience of trying to defend a Grounds Maintenance budget based on the building area unit, we began a survey of the Grounds Maintenance operation which would provide means for tying costs to the land area being maintained.

In searching for a precedence for such a base, we were surprised that we could find none which had been developed by a quantitative analysis. In all cases the elements of personal opinion and speculation ruled out using the material objectively. At this point we arrived at two conclusions, (a) that no precedence was available which could be used and could be rationally defended, and (b) that we would establish such a system and further, that insofar as we were capable, the study would be quantitative in nature and in this respect might establish precedence. The study began which produced our report.

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In beginning this survey there were several local conditions which were favorable to obtaining reliable data. Both the supervising groundsman and the superintendent in charge of the project were above average in Grounds Maintenance experience and competence and as such had developed a degree of performance and discipline in the grounds crews which would yield consistent production and reporting. Santa Barbara is an area where there is a large pool of experienced, capable laborers and grounds-men which had helped make up our forces and which would fill vacancies as they might occur.

In practice the report has already fulfilled most of its objectives. Our Budget Office has accepted the criteria for manning new landscaping projects. We also have a means of providing data for obtaining lower cost landscape projects both in first cost and in maintenance and operating costs if the administration considers these important in financing capital expenditures. Among the many conclusions which can be derived from this report (by using lawn areas as an index against which other area costs can be reflected), some significant ones are as follows:

1. On an average, ground cover costs approximately three (3) times as much per acre to maintain.
2. Shrubs and tree areas approximately half as much per acre to maintain
3. Surfaced areas approximately half as much per acre to maintain

Further, small isolated areas (islands), of any one of these categories may cost as much as ten times as much per acre to maintain as a larger plot of the same material.

Objectives

1. Determine current Grounds Maintenance cost distribution,
2. Provide basis for future Grounds Maintenance budgeting,
3. Provide basic data by which future landscape project designs can be developed to project or reduce maintenance costs

Discussion

This Grounds Maintenance Study was accomplished over a period of one year, March 1965 through February 1966. It includes all labor used in Grounds Maintenance during this period. Considering that materials, (S & E) budget, and the equipment, (E & F) budget, may respond to a short term availability of money, an average of three-years' experience, 1962-63, 1963-64, and 1964-65, is used in the recapitulation sheets.

Wind drought cold, rain, the ocean salt-laden air, and the public use of the campus are all influences which will affect the maintenance program in some degree and a survey of several years might prove more objective; however, no immediate plans are contemplated for continuing this study.

The Grounds Maintenance staff, 30.9 FTE, is headed by a supervising groundsman, and falls under the direct supervision of two foremen. One foreman supervises the "zone" men and the other the "crew" men. This organizational concept was begun in 1962 to give more versatility to the Grounds Maintenance staff. Prior to 1962 each groundsman worked a given area or zone; however, at certain times of the year certain zones required more labor than others. The inflexibility of shifting men from one zone to another to take up these differences prompted the reorganization.

The zones were then increased in size to exceed the area that one man could consistently maintain. There are some differences in zone sizes and intensity of maintenance required; however, the older employees are given the less demanding areas.

The main campus has been divided into seventeen (17) zones with one man permanently assigned to each zone. Zone 18, Married Student Housing (University Apartments) a separate property, has been assigned two men. The duties of the zone men are to keep the plantings fertilized and watered, to pick up papers and debris, edge lawns and ground cover, and mow lawns not covered by gang mowers.

The "crew" was developed from those men who were no longer needed in the cutback zone maintenance program. It was equipped with tools and transportation to cover the entire campus. The crews' major duties include work affected by the seasons, weeding, parkway raking, storm clean-up, and planting. It also serves as a labor pool for plant service projects. The crew is made up of three types of personnel:

Specialists
General full-time laborers
Student laborers

The specialists are persons trained in pest control, sprinkler repairing, pruning, trimming, etc. The general labor is newly hired, inexperienced full-time labor. The student athletes are used wherever we can use unskilled part-time labor. Of this group we have approximately 10 FTE. Each student works a maximum of ten hours a week with a minimum work period of two hours; however, they require an undue amount of supervision and overhead because of the staggered work schedules.

The rate per hour for labor has been increased by 16%, as an estimated average, to cover vacation, sick leave, holidays, and other fringe benefits.

Whereas supervision time has not been included in this report, it has been estimated that the omitted costs would be offset by the increased costs of student labor. For planning purposes the costs per acre are, therefore, not distorted by the lesser efficiency and higher overhead factor connected with student labor.

At times plumbers, equipment operators, carpenters and other craftsmen are utilized on grounds. The time of such personnel has been included in the appropriate survey category.

All lawns and turf areas are cut by tractor-drawn hydraulically manipulated seven-gang fairway mowers. Smaller areas and corners are cut with a 70-inch mower or small power mowers.

Calculation of areas for the different categories and sub-categories of ground area was taken from 1" = 40' scale drawings. The lineal feet of edging and other areas where checking was required was accomplished with a walking wheel measure. Where lawn edging and ground cover edging coincide, the distance is counted twice.

In addition to the acreage listed herein there is a significant area in ocean beach which borders the campus for a distance of 9400 feet on two sides. Portions of this beach area are maintained; however, it is considered recreational area and the maintenance is recharged to the Recreation Department.

Irrigation water is not metered for the campus and the water costs are not reflected in this report. There has been no effort in the irrigation manpower figures to ascertain whether the time was spent in automatic irrigation systems, manual systems, or watering by hand. The areas watered, however, are divided approximately: 38% with automatic valve control, 28% with manual valve control, and 34% for hand sprinkling or hand-set hose sprinkling.

Zones 3, 6 and 18 were maintained at an optimum level in order to establish an index for planning.

Manpower and materials were used as required to hold the areas at the level intended in the landscape architects' design. The balance of available manpower was distributed to the other fifteen zones and the standard of maintenance in these zones was consequently somewhat below that of the three control zones. Thus, the maintenance cost per acre difference between otherwise similar zones would be explainable.

It may be noted that when the costs per acre escalate excessively the areas are usually small isolated plots. As the size of plots in a similar category increase, the cost per acre usually goes down.

Definitions

This campus has defined Grounds Maintenance under three major categories:

I. Landscaped Areas

Landscaped areas cover any planted area including lawns, ground cover, shrubs and trees that are intensively maintained.

II. Surfaced Areas

Surfaced areas include all concrete, brick, asphalt, tile, graveled and other surfaced areas used as walks, roads, plazas and courts.

III. Improved Areas

Improved areas include those grounds areas that are not included in I and II, but must be kept reasonably neat and clean in order to maintain the general appearance of the campus.

FTE Full Time Equivalent Employees

GROUND MAINTENANCE COST RECAPITULATION
MAJOR BUDGET CATEGORIES
INCLUDING SUPPLIES/EXPENSE AND EQUIPMENT/FACILITIES

Zone Number:	Building Maintained:	Site Acreage**:	Zone Man Labor:	Crew Man Labor:	Total		Total S & E: Total E & F:		Cost Per Year
					Cost per Year*	Cost per Year*	Cost per Year*	Cost per Year*	
1	25.09	(1.29)	5,720.40	1,275.75	6,996.15	122.00	55.00	7,173.15	285.90
2	10.06	(0.35)	5,496.75	2,280.60	7,777.35	245.00	110.00	8,132.35	808.38
3	12.63	(2.53)	6,003.90	4,939.20	10,943.10	612.00	275.00	11,830.10	936.67
4	19.95	(2.35)	5,836.95	4,800.60	10,637.55	918.00	550.00	12,105.55	606.79
5	21.57	(2.45)	5,613.30	989.10	6,602.40	122.00	55.00	6,779.40	314.30
6	6.68	(2.65)	5,474.70	4,047.75	9,522.45	367.00	275.00	10,164.45	1,521.62
7	8.93	(1.07)	5,562.90	2,223.90	7,786.80	1,225.00	550.00	9,561.80	1,070.75
8	6.77	(1.86)	5,884.20	3,367.35	9,251.55	612.00	275.00	10,138.55	1,497.57
9	17.20	(1.44)	6,120.45	3,956.40	10,076.85	2,450.00	990.00	13,516.85	785.86
10	11.09	(2.06)	5,632.20	1,997.10	7,629.30	612.00	275.00	8,516.30	767.93
11	8.73	(1.82)	5,833.80	4,725.00	10,558.80	244.00	110.00	10,912.80	1,250.03
12	12.53	(1.54)	5,452.65	1,489.95	6,942.60	122.00	55.00	7,119.60	1,568.20
13	6.94	(2.45)	6,010.20	4,101.30	10,111.50	612.00	275.00	10,998.50	1,584.80
14	45.57	(0.52)	5,518.80	2,286.90	7,805.70	612.00	275.00	8,692.70	190.75
15	86.75	-	-	1,861.65	1,861.65	-	-	1,861.65	21.46
16	13.91	(3.12)	5,846.40	4,164.30	10,010.70	918.00	825.00	11,753.70	844.98
17	45.24	(0.35)	5,395.95	3,776.85	9,172.80	612.00	275.00	10,059.80	222.37
18	10.25	(1.75)	11,377.80	4,148.55	15,526.35	1,845.00	275.00	17,646.35	1,721.60
Totals:	369.89	(29.60)	102,781.35	56,432.25	159,213.60	12,250.00	5,500.00	176,963.60	478.42

Parking
Lots 21.11

Grand Totals
Col. 2 and 3 420.60

* Total Supply & Expense and Equipment & Facilities Costs are distributed on an estimated basis
** Parking Lot Maintenance, Labor, Materials and Equipment are recharged to Parking Operation Fund
*** Building Site Acres are not a factor in the cost per acre per year - Column 10

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USCB GROUNDS MAINTENANCE COST REPORT
 COST RECAPITULATION
 LABOR BY AREA CATEGORY, COST PER ZONE PER YEAR

Zone No.	Acres	I		II		III		Zone Totals			
		Lawns	Grounds Cover	Shrubs & Trees	Surfaced Areas	Parking Lots	Improved Areas	Cost	Acres	Cost	Cost
Cost	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	Cost
1	5.73	3,594.15	0.05	1,143.45	3.06	1,231.65	1.99	507.15	(0.12)	(148.07)	14.26
2	0.76	1,959.30	4.51	2,655.45	1.53	1,332.45	0.45	1,149.75	(1.40)	(1,628.81)	2.81
3	3.77	3,455.55	2.12	3,150.00	2.13	2,101.05	2.08	1,719.90	(0.53)	(616.98)	2.53
4	3.20	3,335.85	1.46	4,847.85	4.06	989.10	3.66	1,222.20	(3.27)	(3,825.25)	7.57
5	3.21	3,093.30	0.13	1,111.95	6.14	1,408.05	3.57	825.30	(0.86)	(1,011.84)	8.52
6	2.69	4,148.55	0.76	2,970.45	0.99	645.75	1.85	954.45	(0.34)	(394.86)	0.39
7	4.75	3,890.25	0.22	2,491.65	1.06	774.90	2.02	428.40	-	-	0.88
8	2.12	2,901.15	1.19	3,316.95	1.08	945.00	2.38	2,088.45	-	-	-
9	4.98	3,411.45	1.26	3,761.10	1.71	1,691.55	5.31	661.50	-	-	3.94
10	1.62	2,116.80	1.25	3,071.25	6.74	1,329.30	0.97	1,055.25	(0.22)	(247.79)	0.51
11	1.89	3,156.30	0.92	3,628.80	1.09	1,181.25	2.02	1,455.30	-	-	2.81
12	1.84	3,918.60	0.17	368.55	2.80	1,990.80	3.23	567.00	(1.61)	(1,875.60)	4.49
13	1.26	3,213.00	1.95	4,762.80	1.26	1,067.85	0.49	904.05	(5.38)	(6,293.15)	1.98
14	24.42	4,406.85	0.12	1,612.80	2.86	894.60	3.32	563.85	(1.58)	(1,850.93)	14.85
15	4.23	403.20	0.32	280.35	19.22	598.50	1.27	283.50	-	-	61.71
16	3.12	2,797.20	3.19	4,384.80	1.93	1,609.65	2.14	847.35	(1.19)	(1,382.02)	3.53
17	12.30	4,454.10	0.32	1,124.55	7.15	1,335.60	5.54	1,408.05	(3.08)	(3,603.12)	19.93
18	2.73	6,662.25	1.55	5,540.85	0.22	2,085.30	4.18	762.30	(1.53)	(1,801.57)	1.57
Totals	84.62	60,917.85	21.49	50,223.60	65.03	23,212.35	46.47	17,403.75	(21.11)	(24,679.99)	152.28
											7,456.05
											369.89
											159,213.60

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Ave. Cost/A.	Building Lot, Acreage & Ave. Cost/acre	Building Sites, Acreage	Grand Total, Acreage	Total Ave. Cost/Acre	Parking Lot, Acreage & Ave. Cost/acre	Ave. Cost/Lot, Acreage & Ave. Cost/acre	Total Ave. Cost/Acre	Parking Lot, Acreage & Ave. Cost/acre	Ave. Cost/Lot, Acreage & Ave. Cost/acre	Total Ave. Cost/Acre	Parking Lot, Acreage & Ave. Cost/acre
Labor	719.90	2,337.07	356.95	374.52	48.96	430.43	3.76	33.12	3.76	430.43	33.12
• S & E	55.39	179.85	27.47	28.81	1.69	14.87	1.69	14.87	1.69	14.87	14.87
" E & F	24.87	80.75	12.33	12.94	54.41	478.42	416.27	21.11	21.11	1,169.11	420.60

*Supply & Expense Costs and Equipment & Facilities Costs are distributed on an estimated basis.
 **Parking Lot Maintenance Labor, Materials, Equipment are recharged to Parking Lot Operations as an S & E charge
 The area and costs are excluded from the Grounds Maintenance Zone Totals and Average Cost per acre

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GROUND MAINTENANCE COST - ZONE #1

AREA DESCRIPTION	Square Footage	Acreage	Lineal Footage	MAN HOURS PER YEAR			Average Rate Per Hour \$	Total Hours Per Year \$	Man Per Hour \$	Cost Per Acre Per Year \$
				Zone	Men	Crew Men				
I-Landscaped Areas										
Lawns	249,599	5.73		427.0	427.0				(3.15)	627.25
Watering			7,563	90.0	11.0	101.0	"	1,345.05		234.74
Edging				142.0	102.0	244.0	"	318.15		
Mowing				48.0		48.0	"	768.60		134.14
Pest Control				275.0	3.0	278.0	"	151.20		26.39
Clean-up				10.0	15.0	25.0	"	875.70		152.83
Fertilizing				1.0	17.0	18.0	"	78.75		13.74
Sprinkler Maint.				1.0			"	56.70		9.90
SUB TOTAL				993.0	148.0	1,141.0	"	3,594.15		
Ground Cover										
Watering				.552	8.0	8.0	"	25.20		22,869.00
Edging					133.0	133.0	"	418.95		504.00
Weeding					60.0	25.0	"	267.75		
Fertilizing					11.0	4.0	"	47.25		5,355.00
Clean-up					62.0	3.0	"	204.75		945.00
Pest Control					31.0	12.0	"	135.45		4,095.00
Sprinkler Maint.					1.0	13.0	"	44.10		2,709.00
SUB TOTAL					306.0	57.0	363.0	"	1,143.45	882.00
Shrubs & Trees										
Watering					35.0	8.0	43.0	"	135.45	44.26
Weeding					31.0	26.0	57.0	"	179.55	58.68
Trimming					264.0	14.0	278.0	"	875.70	286.18
Pest Control					12.0	1.0	13.0	"	40.95	13.38
Fertilizing										
SUB TOTAL					342.0	49.0	391.0	"	1,231.65	402.50
II-Surfaced Areas										
*Parking Lots										
Clean-up										
Maintenance										
SUB TOTAL					75.0	86.0	161.0	"	507.15	
III-Improved Area										
Clean-up										
ZONE TOTALS	1,092,920	25.09	8,085	1,816.0	405.0	2,221.0	"	6,996.15	278.84	

*Parking Lots Maintenance is recharged, not part of the Zone Totals.

GROUND MAINTENANCE COST - ZONE #3

SPE C	AREA DESCRIPTION	Square Footage	Acreage	MAN HOURS PER YEAR			Average Rate Per Hour \$	Total Man Hours Cost Per Year &	Cost per Acre Per Year \$
				Lineal Footage	Zone Men	Crew Men			
I-Landscaped Area									
Lawns	164,221	3.77		43.0	7.0	50.0	(3.15)	157.50	916.59
Watering			11,059	81.0	2.0	83.0	"	261.45	41.78
Edging				98.0	188.0	286.0	"	900.90	238.97
Mowing				42.0	3.0	45.0	"	141.75	37.60
Pest Control				266.0	10.0	276.0	"	869.40	230.61
Clean-up				1.0	103.0	104.0	"	327.60	86.90
Fertilizing				31.0	222.0	253.0	"	796.95	211.39
Sprinkler Mtnc				562.0	535.0	1,097.0	"	3,455.55	
SUB TOTAL									
Ground Cover	92,347	2.12		96.0	120.0	216.0	"	680.40	1,485.85
Watering			8,414	41.0	304.0	345.0	"	1,086.75	320.94
Edging				46.0	81.0	127.0	"	400.05	188.70
Weeding				1.0	4.0	5.0	"	15.75	7.43
Fertilizing				148.0	10.0	158.0	"	497.70	234.76
Clean-up				14.0	7.0	21.0	"	66.15	31.20
Pest Control				31.0	97.0	128.0	"	403.20	190.19
Sprinkler Mtnc				377.0	623.0	1,000.0	"	3,150.00	
SUB TOTAL									
Shrubs & Trees	92,783	2.13		115.0	3.0	118.0	"	371.70	986.41
Watering				34.0	149.0	183.0	"	576.45	174.51
Weeding				308.0	26.0	334.0	"	1,052.10	270.63
Trimming				10.0	9.0	19.0	"	59.85	493.94
Pest Control				9.0	4.0	13.0	"	40.95	28.10
Fertilizing				476.0	191.0	667.0	"	2,101.05	19.23
SUB TOTAL									
II-Surfaced Areas	90,605	2.08							826.88
*Parking Lots	(23,300)			423.0	5.0	428.0	"	1,348.20	648.17
Clean-up				34.0	84.0	118.0	"	371.70	178.70
Maintenance				457.0	89.0	546.0	"	1,719.90	
SUB TOTAL									
III-Improved Areas	110,207	2.53		34.0	130.0	164.0	"	516.60	204.19
Clean-up									
ZONE TOTALS	550,163	12.63	19,473	1,906.0	1,568.0	3,474.0	"	10,943.10	866.44

*Parking Lots Maintenance is recharged, not part of the Zone Totals.

LANDSCAPE MAINTENANCE COST - ZONE #6

****Parking Lots Maintenance is recharged: not part of the Zone Totals.**

GROUND MAINTENANCE COST - ZONE #18

S.S.C C	DESCRIPTION	AREA Square Footage	Acreage	Lineal Footage	MAN HOURS PER YEAR			Average Rate Per Hour \$	Total Hours Per Year \$	Man Cost Per Year \$	Hour Cost Per Year \$
					**Zone	Men	Crew				
I-Landscaped Areas											
Lawns	118,919	2.73	17,213		610.0	21.0	631.0	(3.15)	1,987.65	2,440.38	728.08
Watering					192.0	26.0	218.0	"	686.70	1,686.70	
Edging					840.0	23.0	863.0	"	2,718.45	995.77	
Mowing					39.0	50.0	89.0	"	280.35	102.69	
Pest Control					147.0	50.0	197.0	"	620.55	227.31	
Clean-up					51.0	41.0	92.0	"	289.80	106.15	
Fertilizing					13.0	12.0	25.0	"	78.75	28.85	
Sprinkler Mtnc											
SUB TOTAL					1,892.0	223.0	2,115.0	"	6,662.25		
Ground Cover											
Watering					177.0	11.0	188.0	"	592.20	3,574.74	382.06
Edging					276.0	275.0	551.0	"	1,735.65		
Weeding					216.0	78.0	294.0	"	926.10	597.48	
Fertilizing					26.0	277.0	303.0	"	954.45	615.77	
Clean-up					206.0	50.0	256.0	"	806.40	520.26	
Pest Control					58.0	71.0	129.0	"	406.35	262.16	
Sprinkler Mtnc					6.0	32.0	38.0	"	119.70	77.23	
SUB TOTAL					965.0	794.0	1,759.0	"	5,540.85		
Shrubs & Trees											
Watering					166.0		166.0	"	522.90	9,478.64	2,376.82
Weeding					209.0	71.0	280.0	"	882.00		4,009.09
Trimming					122.0	44.0	166.0	"	522.90	2,376.82	
Pest Control					23.0	7.0	30.0	"	94.50	429.55	
Fertilizing					16.0	4.0	20.0	"	63.00	286.36	
SUB TOTAL					536.0	126.0	662.0	"	2,085.30		
II-Surfaced Areas											
*Parking Lots	182,081 (66,883)	4.18									
Clean-up					104.0	8.0	112.0	"	352.80	84.40	
Maintenance					50.0	80.0	130.0	"	409.50	97.97	
SUB TOTAL					154.0	88.0	242.0	"	762.30		
III-Improved Areas											
Clean-up					68,389	1.57	65.0	86.0	151.0	475.65	302.96
ZONE TOTALS										15,526.35	1,514.77

*Parking Lots Maintenance is recharged, not part of the Zone Totals

**Two Zone Men